Anatomy of Cyperaceae.—The comparative anatomy of the Cyperaceae has been studied by PLOWMAN,[31] and as usual the chief interest centers in the stem. Amphivasal bundles are found throughout the rhizomes of all large-leaved species and at the nodes of aerial stems; elsewhere the bundles are collateral. The amphivasal bundles arise through the introduction into the node of the numerous leaf-trace bundles, and are independent of the branching of the stem. Hence the leaf is to be regarded as the dominant factor in the development of the stelar characteristics of the family and probably of the other monocotyledonous families. The course of the bundles in the rhizome approaches the "palm type," but in the culm the leaf-trace bundles pass down as cortical bundles through one internode and then fuse with the bundles of the central cylinder by a ring-like amphivasal plexus. The seedling and in some cases the floral axis show a simple tubular stele, which is to be regarded as the primitive condition, in contrast with the medullary and amphivasal bundles occurring in many parts of the plant. A cambium is present in the bundles at the nodes of *Scirpus cyperinus* and other species. These features indicate that the Cyperaceae is one of the more primitive groups of monocotyledons, though showing signs of specialization and reduction, accompanied by a high degree of anatomical unity. The view which derives the monocotyledons from an essentially dicotyledonous ancestry receives further support. The author proposes a division of the family into "Amphivasae" and "Centrivasae;" he also gives a key to the genera, based on anatomical characters. The paper is accompanied by a number of excellent photomicrographs.—M. A. CHRYSLER.

Origin of Cycadaceae.—WORSDELL[32] has published a *résumé* of his views as to the origin of the Cycads from the Pteridosperms, with full bibliography. The part dealing with the origin of axial structures is of greatest interest; and the thesis is that the Medullosan ancestry is clear. It is claimed that the cotyledonary node and the axis of the strobilus are the two principal regions for revealing ancestral characters. Much stress is laid upon MATTE's discovery of polystely in the cotyledonary node of *Encephalartos Barteri;* and also upon the very irregular orientation of the bundles of the peduncle of Stangeria. According to the author's view, the endarch cylinder of Lyginondedron and of the Cycads is of polystelic origin, coming from Medullosan ancestors, each constituent bundle being the homologue of the single bundle of the monostelic Heterangium. The endarch condition arises from the degeneration of the internal vascular tissues. Numerous illustrations are given, intended to show how the various vascular structures of both Pteridosperms and Cycads suggest this view and are most easily explained by it. The whole presentation is

[31] PLOWMAN, A. B., The comparative anatomy and phylogeny of the Cyperaceae. Annals of Botany **20**:1–33. *pls. 1–2.* 1906.

[32] WORDSELL, W. C., The structure and origin of the Cycadaceae. Annals of Botany **20**:129–159. *figs. 17.* 1906.

particularly valuable in bringing scattered data together in compact form, although opinions may vary as to their interpretation.

A new term of classification is introduced with "Cycadophyta," used to include Pteridosperms (Cycadofilices), Bennettitales, and Cycadales. The author also discredits somewhat the value of the ontogeny of the vascular structures as indicating their phylogeny.—J. M. C.

Osmosis and osmotic pressure.—A revolutionary paper upon the nature of osmosis and osmotic pressure has been published by KAHLENBERG,[33] who gives detailed accounts of his experiments. He shows clearly that whether osmosis will take place or not depends upon the specific relations between the septum and the liquids bathing it. If osmosis occurs these relations determine the magnitude of the pressure and the direction of the main current. There is, he claims, no such thing as a strictly semipermeable membrane, since a minor movement in the reverse direction always occurs, though it is often insignificant or practically negligible. The force concerned in osmotic processes lies not merely in the specific affinities between the solvent and the solutes, but primarily in their relation to the membrane, whether it be called "potential energy of solution," "internal pressure," or (as KAHLENBERG prefers) "chemical affinity." In measuring osmotic pressures (for which he devised a new apparatus), stirring the liquids is absolutely essential—a factor not previously reckoned with; and in his experiments these measurements show such unlike pressures with the same substances when different membranes are used, and such changes with different temperatures that he holds them irreconcilable with the theory that, as a general rule, solutes conform to the behavior of gases, however closely some in water may do this. The paper deserves the closest attention from every physiologist; yet the weighty evidence against KAHLENBERG'S conclusions must not be forgotten.—C. R. B.

The vitality of buried seeds.—DUVEL gives a preliminary account of experiments on the vitality of buried seeds,[34] of some of the common economic plants and weeds of the United States, representing 109 species, 84 genera, and 34 families. In December, 1902, eight to twelve lots of each species of seeds were buried at three depths: 15–20, 46–56, 90–105 $^{\mathrm{cm}}$. A sample of each is to be taken up at given periods and tested for vitality along with controls stored in a dry place.

Tests up to date show the following results. In some cases none of either the controls on the buried seeds grow. Among these are: *Axyris amaranthroides*, *Bursa bursa-pastoris*, *Polygonum pennsylvanicum*, *P. persicaria*, *P. scandens*.

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33 KAHLENBERG. L., On the nature of the process of osmosis and osmotic pressure, with observations concerning dialysis. Journ. Phys. Chem. **10**:141–209. 1906. Published also in Trans. Wis. Acad. **15**:209–272. 1906.

34 DUVEL, J. W. T., Vitality of buried seeds. Bureau Plant Industry Bull. 83. pp. 22. *pls. 3*. 1905.